

the utricular cells of the spore-sac. The primordial utricle is however completely isolated in the lower cell, *i. e.* the immediate elongation of the nucleary membrane itself, the contents of which do not consist as before of chlorophylle, but of cytoblastema. When acted upon by nitric acid, it frequently contracts so much, as to appear torn into large band-like fragments, which become somewhat spirally twisted (fig. 25). Its membrane is not perfectly smooth but finely granular. This does not occur so much in the lowest segments of the stem. It is remarkable, that when treated with nitric acid, which contracts it considerably, it exhibits various-sized conical prominences. Hence it appears somewhat angular or wavy. The small projections appear generally to pass into minute depressions on the axial membrane. At a subsequent period a secondary membrane is formed between it and the axis.

From what has been stated, it appears that the stem consists of an epidermoidal membrane, subsequently also of a secondary one, the primordial utricle and the cell-contents. The above epidermoidal membrane, which is the direct elongation of the nucleary membrane, *continues to grow with the plant, and in such a manner that the plant remains in it as in a bag.* Kützing calls this membrane the *peridermis*, and considers it as identical with the cuticle of Brongniart, which covers the true epidermis of more highly organized plants*. There can however be no question here of a true epidermis, nor indeed in any of the Algæ.

[To be continued.]

XXXV.—*On the Occurrence of Tetraspores in Algæ.*

By G. H. K. THWAITES, Esq.

To the Editors of the Annals of Natural History.

GENTLEMEN, 2 Kingsdown Parade, Bristol, March 19, 1846.

IN the last December Number of your valuable Journal is an extract from a letter presented by M. Montagne to the French Academy on the subject of an interesting Alga belonging to the *Zygnemata*, and discovered by M. Durieu in Algiers, in which the fruit consists of four distinct spores in each sporangium.

The Rev. M. J. Berkeley obligingly favoured me with a sight of an authentic specimen of this species, in which the character was very obvious.

On examining, a few days ago, some spores of *Mesocarpus scalaris*, Hassall, I thought I could detect in them indications of a quaternary division, and I sent specimens to Mr. Berkeley for

* Kützing, *l. c.* p. 86.

his inspection, who wrote me in reply that he could see the division into four pretty distinctly.

I have since observed the same peculiarity in the spores of *Tyndaridea insignis*, Hass., and *Staurocarpus gracilis*, Hass., and, as Mr. Berkeley remarks to me, it may prove more general than has hitherto been supposed. The separation of the contents of the sporangium into four portions does not take place in our three species until the fruit is nearly mature, and this soon afterwards becomes too opaque for the character to be seen, so that it can be observed only in a particular state of the plant. The sporangium in all the species I have mentioned is more or less compressed vertically.

Mesocarpus scalaris may occasionally be observed with some of its cells considerably inflated; and each of these enlarged cells is found to contain a globose echinulate body very much resembling the sporangium of some of the *Desmidiæ*, and respecting the character of which it is difficult to determine: this body may first be seen as a very small spherical cell, apparently quite smooth, and containing an oily-looking fluid; it subsequently grows much larger and becomes furnished with several long curved spines; its texture seems to be corneous. It does not appear to be developed at the expense of the endochrome of the cell which contains it, but in some instances I have thought the quantity of endochrome rather larger than usual in the inflated cells. Can this curious body be an abnormal growth of the nucleus, or is it an internal parasite? Some of the cells of a *Tyndaridea* received from Mr. Ralfs, have within them a fusiform transversely ribbed body, which is probably of a similar character to the spherical ones found in the *Mesocarpus*.

I am, Gentlemen, your very obedient servant,

G. H. K. THWAITES.

XXXVI.—*Botanical Notices from Spain.*

By MORITZ WILLKOMM*.

[Continued from p. 196.]

No. XI. GRANADA, July 5, 1845.

BEFORE my departure from Malaga I visited, in the beginning of last month, the southern portion of the Sierra de Mijas, lying near the village of Chuniana. Along the bank of the Guadalhorce occurred *Scolymus maculatus*, L., *Achillea Ageratum*, L., and various *Carices* in flower, and on boulders and sand above Chuniana and on the slopes of the mountain-chain blossomed *Ruta montana*, L., a small form of

* Translated from the *Botanische Zeitung*, Nov. 21, 1845.